

Amendments to the Claims

Please amend the claims as follows.

1-86. (canceled)

87. (previously presented) A method of fabricating a semiconductor device, comprising the steps of:

providing a support substrate having a first surface and a second surface, each surface having terminal pads located thereon;

providing a semiconductor die having a first surface with at least one standoff attached thereto, and a second surface; and

mounting the second surface of the die on the first surface of the substrate.

88. (original) The method of Claim 87, wherein the die is flip chip mounted on the support substrate.

89. (original) A method of fabricating a semiconductor device, comprising the steps of:

providing a support substrate having a first surface and a second surface;

providing a semiconductor die having a first surface and a second surface;

forming a standoff on the first surface of the die; and

mounting the second surface of the die on the first surface of the substrate.

90. (original) The method of Claim 89, wherein the step of forming the standoff comprises dispensing a material on the surface of the die by a method selected from the group consisting of screen printing, stenciling, coating, masking, stamping, heat stamping, spray coating, and direct spreading.

91. (original) The method of Claim 89, wherein the step of forming the standoff comprises a process selected from the group consisting of electroplating and anodizing.

92. (original) The method of Claim 89, wherein the step of forming the standoff comprises dispensing a flowable material onto the die; and allowing the flowable material to solidify.
93. (original) The method of Claim 92, wherein the flowable material is dispensed using a liquid capillary.
94. (original) The method of Claim 92, wherein the flowable material is a curable thermoset polymeric material.
95. (original) The method of Claim 94, wherein the polymeric material is a novolac epoxy resin.
96. (original) The method of Claim 89, wherein the standoff comprises a prefabricated object, and the step of forming the standoff comprises affixing the object to the surface of the die.
97. (original) The method of Claim 96, wherein the object is affixed using an adhesive material.
98. (original) The method of Claim 97, wherein the adhesive material comprises an adhesive paste.
99. (original) The method of Claim 97, wherein the adhesive material comprises a double-sided adhesive tape.
100. (original) The method of Claim 97, wherein the standoff comprises an adhesive-backed decal.
101. (original) The method of Claim 96, wherein the standoff comprises a thermally conductive material.

102. (original) The method of Claim 101, wherein the conductive material is selected from the group consisting of copper, aluminum, gold and silver.

103. (original) The method of Claim 102, wherein the standoff comprises a copper foil.

104. (original) The method of Claim 89, wherein the standoff comprises a plastic material, and the step of forming the standoff comprises a process selected from the group consisting of injection molding, extrusion, blow molding, compression molding, transfer molding, and thermoforming.

105. (original) The method of Claim 89, wherein the step of forming the standoff comprises an electroplating or anodizing process.

106. (original) The method or Claim 105, wherein the standoff comprises a thermally conductive material.

107. (original) The method or Claim 106, wherein the conductive material is selected from the group consisting of silver, copper, aluminum, gold and nickel.

108. (original) The method of Claim 89, wherein the standoff is in the form of an enclosure, and the method further comprises disposing a heat sink material on the surface of the die within the standoff enclosure.

109. (original) The method of Claim 108, wherein the heat sink material comprises copper or aluminum.

110. (original) The method of Claim 109, comprising adhering a layer of copper foil to the surface of the die to form the heat sink.

111. (original) The method of Claim 89, wherein the die is flip chip mounted on the support substrate.

112. (previously presented) The method of Claim 89, further comprising:
providing a second semiconductor die having a first surface with at least one standoff affixed thereto, and a second surface; and
mounting the second surface of the die on the second surface of the substrate.
113. (original) A method of fabricating a semiconductor device, comprising the steps of:
providing a support substrate;
providing a pair of semiconductor dies, each having a first surface and a second surface;
forming a standoff on the first surface of each of the dies; and
mounting the dies on opposing sides of the support substrate, the second surface of each of the dies disposed on the substrate.
114. (previously presented) A method of fabricating a semiconductor die package, comprising the steps of:
providing a die/substrate unit comprising a semiconductor die on a support substrate, the die having a first surface with one or more standoffs attached thereto, the standoffs having a height, and a second surface disposed on the support substrate;
providing a mold tooling comprising a pair of mold plates defining a molding chamber therebetween, the mold plates having an inner surface;
positioning the die/substrate unit within the molding chamber of the mold tooling, with the standoffs in contact with the inner surfaces of the mold plates; and
flowing a molding compound into the molding chamber to at least partially encapsulate the die/substrate unit, wherein the die/substrate unit is maintained in a centralized and substantially planar orientation within the molding chamber as the molding compound is flowed thereabout.

115. (previously presented) A method of fabricating a semiconductor die package, comprising the steps of:

providing a die/substrate unit comprising a semiconductor die on a support substrate, the die having a first surface with one or more standoffs attached thereto, the standoffs having a height, and a second surface disposed on the support substrate;

providing a mold tooling comprising a pair of mold plates defining a molding chamber therebetween, the mold plates having an inner surface;

positioning the die/substrate unit within a molding chamber between a pair of mold plates each having an inner surface such that the standoffs are in contact with the inner surfaces of the mold plates; and

introducing a molding compound into the molding chamber, wherein the die/substrate unit is maintained in a centralized and substantially planar orientation within the molding chamber as the molding compound is flowed thereabout.

116. (previously presented) A method of fabricating a semiconductor die package, comprising the steps of:

providing a die/substrate unit comprising a semiconductor die on a support substrate, the die having a first surface with one or more standoffs affixed thereto, the standoffs having a height, and a second surface disposed on the support substrate;

providing a mold tooling comprising a pair of mold plates defining a molding chamber therebetween, the mold plates having an inner surface;

positioning the die/substrate unit within a molding chamber between a pair of mold plates each having an inner surface, such that the standoffs are in contact with the inner surfaces of the mold plates; and

introducing a molding compound into the molding chamber, wherein the die/substrate unit is maintained in a centralized and substantially planar orientation within the molding chamber as the molding compound is flowed thereabout.

117. (previously presented) A method of fabricating a semiconductor die package, comprising the steps of:

providing a semiconductor device comprising a pair of semiconductor dies situated on opposing sides of a support substrate; each die having a first surface with one or more standoffs affixed thereto, and a second surface disposed on the support substrate;

providing a mold tooling comprising a pair of mold plates defining a molding chamber therebetween; the mold plates having an inner surface;

positioning the semiconductor device within a molding chamber between a pair of mold plates each having an inner surface, such that the standoffs are in contact with the inner surfaces of the mold plates; and

introducing a molding compound into the molding chamber, wherein the support substrate of the semiconductor device is maintained in a centralized and substantially planar orientation within the molding chamber as the molding compound is flowed thereabout.

118. (previously presented) A method of fabricating a semiconductor die package, comprising the steps of:

fabricating a semiconductor device by providing a pair of semiconductor dies, each having a first surface and a second surface, forming a standoff on the first surface of each of the dies, and mounting the dies on opposing sides of a support substrate, the second surface of each of the dies disposed on the substrate;

positioning the semiconductor device within a molding chamber between a pair of mold plates each having an inner surface, such that the standoffs are in contact with the inner surfaces of the mold plates; and

introducing a molding compound into the molding chamber, wherein the support substrate of the semiconductor device is maintained in a centralized and substantially planar orientation within the molding chamber as the molding compound is flowed thereabout.

119. (previously presented) A method of fabricating a semiconductor die package, comprising the steps of:

fabricating a semiconductor device by providing a pair of semiconductor dies, each die having a standoff attached to a first surface of the die, and mounting the dies on opposing sides of a support substrate, the second surface of each of the dies disposed on the substrate;

positioning the semiconductor device within a molding chamber between a pair of mold plates each having an inner surface, such that the standoffs are in contact with the inner surfaces of the mold plates; and

introducing a molding compound into the molding chamber, wherein the support substrate of the semiconductor device is maintained in a centralized and substantially planar orientation within the molding chamber as the molding compound is flowed thereabout.

120. (original) A method of fabricating a semiconductor die package, comprising the steps of:

providing a semiconductor device comprising a pair of semiconductor dies disposed on opposing sides of a support substrate; each die having a first surface and a second surface disposed on the support substrate;

providing a mold tooling comprising a pair of mold plates defining a molding chamber therebetween; each mold plate having an inner surface with a standoff disposed thereon;

positioning the semiconductor device within the molding chamber between the mold plates such that the standoffs are in contact with the first surfaces of the dies; and

introducing a molding compound into the molding chamber, wherein the support substrate of the semiconductor device is maintained in a centralized and substantially planar orientation within the molding chamber as the molding compound is flowed thereabout.

121. (previously presented) A method of fabricating a semiconductor die package, comprising the steps of:

fabricating a semiconductor device by providing a pair of semiconductor dies, each die having a standoff attached to a first surface, and mounting the dies on opposing sides of a support substrate, the second surface of each of the dies disposed on the substrate;

positioning the semiconductor device within a molding chamber between a pair of mold plates each having an inner surface, such that the standoffs are in contact with the inner surfaces of the mold plates; and

introducing a molding compound into the molding chamber, wherein the support substrate of the semiconductor device is maintained in a centralized and substantially planar orientation within the molding chamber as the molding compound is flowed thereabout.

122. (previously presented) A method of fabricating a semiconductor die, comprising the step of:

forming at least one standoff on a surface of the semiconductor die.

123. (previously presented) The method of Claim 122, wherein the step of forming the standoff comprises dispensing a material on the surface of the die by a method selected from the group consisting of screen printing, stenciling, coating, masking, stamping, heat stamping, spray coating, and direct spreading.

124. (previously presented) The method of Claim 122, wherein the step of forming the standoff comprises a process selected from the group consisting of electroplating and anodizing.

125. (previously presented) The method of Claim 122, wherein the step of forming the standoff comprises dispensing a flowable material onto the die, and allowing the flowable material to solidify.

126. (previously presented) The method of Claim 125, wherein dispensing the flowable material is by use of a liquid capillary.

127. (previously presented) The method of Claim 125, wherein the flowable material comprises a curable thermoset polymeric material.

128. (previously presented) The method of Claim 122, wherein the step of forming the standoff comprises mounting a prefabricated object to the surface of the die.

129. (previously presented) The method of Claim 128, wherein the object is mounted using an adhesive paste, a double-sided adhesive tape, or a combination thereof.

130. (previously presented) The method of Claim 128, wherein mounting the standoff comprises affixing an adhesive-backed object to the at least one surface of the die.

131. (previously presented) The method of Claim 122, wherein the standoff comprises a thermally conductive material.

132. (previously presented) The method of Claim 122, wherein the standoff comprises a conductive material selected from the group consisting of copper, aluminum, gold and silver.

133. (previously presented) The method of Claim 132, wherein the standoff comprises a copper foil.

134. (previously presented) The method of Claim 122, wherein the standoff comprises a plastic material.

135. (previously presented) The method of Claim 122, further comprising forming ball contacts on a second surface of the die.

136. (previously presented) The method of Claim 122, further comprising mounting the die on a support substrate.

137. (previously presented) A method of fabricating a semiconductor die, comprising the steps of:

forming at least one standoff on a surface of the die, the standoff being in the form of an enclosure; and

forming a heat sink within the standoff enclosure.

138. (previously presented) The method of Claim 137, wherein the heat sink comprises copper or aluminum.

139. (previously presented) The method of Claim 137, wherein the step of forming the heat sink comprises adhering a layer of copper foil to the surface of the die within the standoff enclosure.

140. (previously presented) A method of fabricating a semiconductor device, comprising the steps of:

forming at least one standoff affixed onto a first surface of the die; and
mounting the second surface of the die on a first surface of a support substrate.

141. (previously presented) The method of Claim 140, wherein the support substrate comprises a flexible material.

142. (previously presented) The method of Claim 141, wherein the support substrate comprises a polyimide film.

143. (previously presented) The method of Claim 140, wherein the support substrate comprises a rigid material.

144. (previously presented) The method of Claim 143, wherein the rigid material is selected from the group consisting of a polymer material, ceramic material, metal clad fiber board, and metal leadframe.

145. (previously presented) The method of Claim 144, wherein the support substrate comprises a polymer material selected from the group consisting of bismaleimide triazine resin, epoxy resin, FR-4 laminate, and FR-5 laminate.

146. (previously presented) The method of Claim 140, further comprising forming external contacts on a second surface of the support substrate.

147. (previously presented) The method of Claim 146, further comprising mounting the external contacts on the support substrate onto a second support substrate.

148. (previously presented) A method of fabricating a semiconductor device, comprising the steps of:

forming at least one standoff affixed onto a first surface of a die;

mounting a second surface of the die on a first surface of a support substrate, the support substrate having contact pads on a second surface and an opening to expose bond pads on the second surface of the die; and

connecting the bond pads on the second surface of the die through the opening to the contact pads on the second surface of the support substrate.

149. (previously presented) The method of Claim 148, further comprising the step of encapsulating at least the connection between the bond pads and the contact pads.

150. (previously presented) The method of Claim 148, further comprising forming external contacts on the second surface of the support substrate.

151. (previously presented) A method of fabricating a semiconductor device, comprising the steps of:

forming at least one standoff affixed onto a surface of the die;

mounting an opposing surface of the die on a support substrate; and

connecting bond pads on the die to contact pads on the support substrate.

152. (new) The method of Claim 92, wherein the step of forming the standoff comprises dispensing the flowable material by a method selected from the group consisting of screen printing, stenciling, coating, masking, stamping, heat stamping, spray coating, and direct spreading.

153. (new) The method of Claim 122, wherein the step of forming the standoff comprises dispensing the flowable material by a method selected from the group consisting of screen printing, stenciling, coating, masking, stamping, heat stamping, spray coating, and direct spreading.